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Analytical theory of continued fractions and time evolution in many-particle systems.

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The analytical theory of continued fractions plays a key role in the time evolution behavior in many-particle systems. The aim of this study was to understand and to develop properties of relevant continued fractions for physical applications. Substantial progress has been made and reported in eleven (11) journal articles and several other conference proceedings also published.

14. SUBJECT TERMS

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FINAL REPORT

ARO Grant #27580MA
Title: "Analytical Theory of Continued Fractions and Time Evolution in Many-Body Systems."
Principal Investigator: M. Howard Lee, Department of Physics and Astronomy, The University of Georgia, Athens, Georgia 30602-2451

A. Problems Studied -

The analytical theory of continued fractions plays a key role in out understanding of time evolution in many-particle systems. The continued fractions that appear in these physical problems are highly specialized. The aim of this study was to understand and to develop the properties of relevant continued fractions for physical applications.

B. Most Important Results -

The two most important results of our study are given in our publications #3 and #7 (see C below). The paper #3 shows that important scattering results can be obtained by the time evolution approach developed by us. The paper #7 shows that exact results for scattering cross sections can be obtained by the method of continued fractions developed by us.

C. Publication Lists -

1. M. Long and M. H. Lee
The classical susceptibility of a free electron gas.
J. Math. Phys. **33**, 1799 (1992)

2. M. H. Lee
Slow Decay in a spin system and spin precession.
Kor. J. Phys. **24**, 558 (1992)

3. M. H. Lee and O. I. Sindoni
Dynamic response function and Kramers-Kronig relations in optic inversion.
Phys. Rev. A **46**, 3028 (1992)

4. M. H. Lee
Summary talk with a few reflections.
Kor. J. Phys. **24**, S111 (1992)

5. M. H. Lee
Velocity autocorrelation function in hydrodynamics.
J. Phys. Condensed Matter **4**, 10487 (1992)

C. Publication Lists - (continued)

6. M. H. Lee
Autocorrelation functions for Hermitian many-body systems.
Phys. Rev. B **47**, 8293 (1993)

7. J. Hong and M. H. Lee
Asymptotically exact solution of the dynamic structure factor.
Phys. Rev. Lett. **70**, 1972 (1993)

8. M. H. Lee
Note on a log integral for the plasma energy.
Can. J. Phys. 1994 (accepted)

9. M. H. Lee
Polylogarithmic analysis of the chemical potential.
J. Math. Phys. 1994 (accepted)

10. M. H. Lee
Price's bound on the structure factor.
J. Math. Phys. 1994 (accepted)

11. M. H. Lee, J. Kim, W. P. Cummings and R. Dekeyser
Topology of Hilbert spaces and dynamics of molecular processes.
J. Mol. Str. 1994 (accepted)

D. List of Participants -

M. H. Lee - Principal Investigator
M. Long - Graduate Student, received Ph.D. in 1994